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ABSTRACT

In presenting a historical overview of trends in vocabulary research, this paper emphasizes the importance of word knowledge as a critical component in reading comprehension. It describes research examining current psychological and pedagogical models as they relate to vocabulary knowledge, and explores vocabulary research in the area of specific teaching strategies as it has grown out of previous vocabulary research findings. It then presents several teaching strategies that reflect an information processing orientation and describes semantic mapping and semantic feature analysis procedures, as well as other, more conventional vocabulary instructional strategies. (Author/FL)

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AN INVESTIGATION OF THE TRENDS IN VOCABULARY RESEARCH AND THE EFFECTS OF PRIOR KNOWLEDGE ON INSTRUCTIONAL STRATEGIES FOR VOCABULARY ACQUISITION

by

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Report from the Program on
Student Diversity and Classroom Processes: Skill Development -- Language Arts

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Introduction

The intent of this paper is to present a historical overview of trends in vocabulary research, emphasizing the importance of word knowledge as a critical component in reading comprehension. Vocabulary research in the area of specific teaching strategies is explored as it has grown out of former vocabulary research findings; several teaching strategies that reflect an information-processing orientation are presented.

Historically, research on word knowledge and vocabulary acquisition has focused primarily on two main topics: (1) a verification that word knowledge per se is an important component in reading comprehension, and (2) an investigation into the discrete skills involved in vocabulary acquisition. In the last ten to fifteen years, however, researchers have also begun to examine the efficacy of specific teaching strategies for the development of vocabulary knowledge.

Predominant psychological theories of learning have always had an influence on investigators' views of the reading process and consequently have affected the way in which vocabulary learning has been studied. New psychological and pedagogical models of learning which are derived from information processing paradigm have a great impact on current research on vocabulary learning. These models will be discussed as they relate to current instructional strategies in vocabulary development research.

Trends in Vocabulary Research

Word Knowledge in Relation to Reading Comprehension

Word knowlege has always been identified as a significant component in comprehension. Early researchers in reading comprehension and in verbal

intelligence found that vocabulary knowledge played a significant role in both areas. For example, Pressey and Pressey (1921) concluded that silent reading performance improved with a large vocabulary. Hilliard (1924) stated that a child's vocabulary level was second only to general intelligence when several measures were correlated with reading comprehension. In 1925, Irion reported that word knowledge was a significant variable for reading comprehension. Even though Irion's study dealt with correlations of literal and inferential test scores with total passage comprehension of a wide variety of reading materials, there was the implication that word knowledge was important for passage comprehension. In a study by Albright (1927) in which she classified student errors in answering questions assessing passage comprehension, knowledge of word meanings was once again an imporatnt determinant in comprehension.

The early factor analytic studies of reading comprehension attempted to specify specific skills or skill areas important for comprehension. Davis (1942, 1944), a notable researcher in this area, was one of the first to examine the component skills involved in reading comprehension. In his landmark study, Davis (1942) factor analyzed nine reading comprehension subskills resulting in the identification of two primary reading skill components: (1) Word Knowledge or vocabulary and (2) Reasoning in Reading.

In 1939 Davis had participated in the development of a diagnostic test, the Cooperative Reading Comprehension Tests. The intent of the test was "to provide reliable measures of the most important independent mental abilities and specific skills that are required in understanding the kinds of materials that students commonly have to read" (underscoring added; Davis, 1942, p. 365). Davis conducted a survey of the literature

in the field of reading to determine which reading skills, as reported by authorities in the field, were considered to be the most important elements in reading comprehension.

From a compilation of several hundred skills, nine clusters of testable skills were selected to form the basis of Form Q of the Cooperative Reading Comprehensive Tests. (Refer to Column 1 of Table 1.) Multiple-choice test items, with five responses for each item, were constructed for each of the skill areas in such a way that each item in Form Q tested only one skill area. The number of items for each skill was based "on the judgments of authorities in the field of reading concerning the importance of each skill in reading comprehension" (p. 368). Thus, for example, Skill 1 Knowledge of Word Meanings, represented what was considered by authorities in reading as the most important skill and, therefore, it had the most test items (60). (Refer to Column 2 of Table 1.)

After the Cooperative Reading Comprehension Test had been published by the Test Service of the American Council on Education, Davis administered From Q of the test to 421 college freshmen enrolled at teachers colleges in Connecticut and Massachusetts. The first step in the data analysis was to determine the intercorrelations of the scores in the nine skill areas. As the diagnostic test was designed to represent independent abilities, it was anticipated that there would be low correlations among the skills. Contrary to the anticipated results, the intercorrelations indicated a fair amount of inter-relationships among the skills. Subsequently, the data were factor analyzed using Kelley's (1935) principal axes method. "The nine principal components that were obtained were remarkably clear-cut and lent themselves to ready interpretation," according to Davis (1942, p. 368). Davis noted

Table 1

Nine Skills in Reading Comprehension

Skill	No. of items	Mean	Variance
1. Recalling word meanings	60	23.77	134.70
2. Drawing inferences about the meaning of a word from content	20	12.70	10.56
3. Following the structure of a passage	9	4.20	3.01
4. Formulating the main thought of a passage	5	2.97	1.22
5. Finding answers to questions answered explicitly or merely in paraphrase in the content	22	18.10	6.05
6. Weaving together ideas in the content	42	25.67	32.17
7. Drawing inferences from the content	43	28.46	33.75
8. Identifying a writer's techniques, literary devices, tone, and mood	10	6.75	3.46
9. Recognizing a writer's purpose, intent, and point of view	27	15.19	16.54

Note. From "Research in Comprehension in Reading" by F. B. Davis, Reading Research Quarterly, 1968, 3(4), P. 504.

that two components accounted for 89% of the variance. He interpreted these components as: (1) Word Knowledge and (2) Reasoning in Reading. An examination of the data shows that component 1, Word Knowledge, is primarily attributable to Skill 1, Knowledge of Word Meanings. On the other hand, it appears that component 2, Reasoning in Reading, is made up of two reading skills, Skills 6 and 7.

In later studies, Davis (1968, 1972) continued to demonstrate a "components view" of comprehension with knowledge of word meanings and reasoning in reading as the two primary components. Other researchers who reanalyzed Davis' work, while often not in agreement with Davis' findings, continued to defend the components view of comprehension (Hunt, 1957; Spearitt, 1972) with only a few exceptions (Thorndike, 1971; Thurstone, 1946).

Though there is agreement among many researchers that word knowledge is an important component of comprehension, there have been few research studies designed to examine the effectiveness of training in vocabulary development, either independently or in relation to the entire comprehension process (Davis, 1972). This is probably due, in part, to the fact that the question of why word knowledge is so important is still unsettled. There are at least three positions that attempt to explain the high correlation between vocabulary knowledge and linguistic competency (Anderson & Freebody, 1979).

The first, an instrumentalist hypothesis, claims that knowing words enables text comprehension (causal chain). Where vocabulary comes from is not of prime concern; however, once possessed, word knowledge helps the reader understand text. The second position, the aptitude hypothesis, suggests that some persons are better able to comprehend text because of

superior verbal ability; that is, those children with greatest verbal fluency tend to comprehend best. The third position, the knowledge hypothesis, examines the relationship of stored word knowledge to the comprehension of discourse. Word knowledge is viewed within the context of what a person knows and brings to the task when comprehending text; word knowledge, per se, reflects knowledge in general. The premise basic to this position is that prior knowledge is crucial for understanding text. It is not just the individual word meanings that are important, but the entire conceptual framework elicited by word meaning it is this general knowledge which interacts with text to produce comprehension.

These positons are not inexorably separate, but it is important to distinguish the knowledge from the other two. The instrumentalist and aptitude hypotheses stress individual word meanings and verbal ability, respectively, whereas the knowledge hypothesis emphasizes conceptual frameworks.

The first two hypotheses, the instrumentalist and the aptitude hypotheses, have been researched historically within a behavioristic paradigm for psychological theories of learning and have tended to focus on delimiting what the word knowledge skills are. The educational implications of these two hypotheses are that instruction in strategies which are designed to increase vocabularies or which emphasize drill on reading fundamentals (e.g., word identification, practice of literal recall) will also increase text comprehension. The third hypothesis, the knowledge hypothesis, is rooted in an information processing paradigm and has historically--or perhaps more aptly, ahistorically--grown out of behavioristic notions. Instead of trying to identify the skills involved in word acquisition and word knowledge, investigators in this third area of research are concerned with how

these skills are acquired and applied. The educational implication of the knowledge hypothesis are that instruction which taps the prior knowledge base, i.e., which consciously delineates the categorical relationships inherent in word knowledge, will improve text comprehension.

Psychological Foundations for Knowledge Hypothesis

The notion of formulating categorical relationships as a fundamental mental process is not new. In fact, it is probably one of the few mental operations that most psychologists and educators would actually agree does take place in the minds of thinkers and readers.

When a person hears or reads the word dog, a dictionary definition of the word does not necessarily flash in front of a person's mind's eye. To perceive, understand, or remember what a dog is, a person must call up some or all associations that word has for the object (See Figure 1). Through these associations, also termed a schema (Bartlett, 1932; Rumelhart, 1975) and a frame (van Dijk, 1977), the concept of dog is instantiated. The elicited definition reflects the person's personal predilections and prior experiences (real or imaginary) with the object, in conjunction with the demanded constraints of the particular context.

Vocabulary knowledge or word concept knowledge is viewed, then, as an integration of the many possible associated links for any word with the situational constraints that together construct a word's meaning. Instruction in new vocabulary words, whether as part of a discrete vocabulary lesson or in conjunction with reading texts, must activate the categorization of relationships inherent in word knowledge.

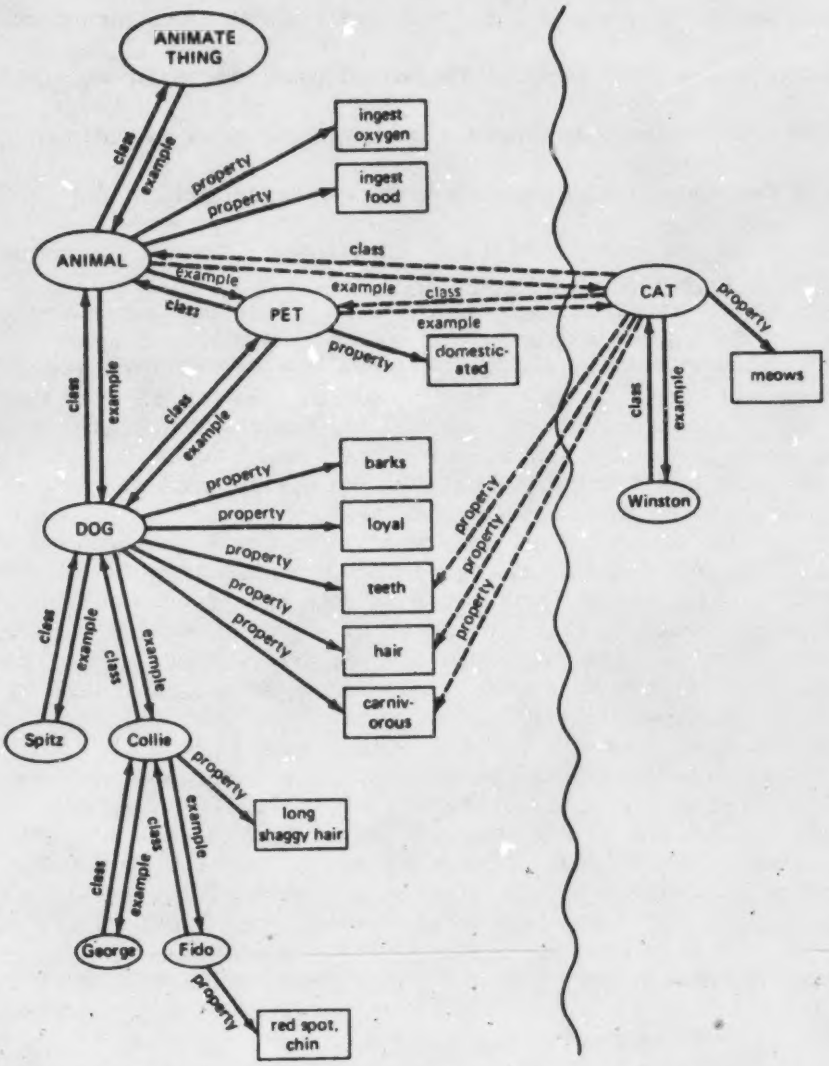

Figure 1. Incomplete semantic map of dog. *

*Johnson, D. D., & Pearson, P. D. Teaching Reading Vocabulary. New York: Holt, Rinehart and Winston, 1978, p. 36.

The first studies that looked at how words are stored in and retrieved from memory, rather than how important word knowledge is, found intriguing learning characteristics related to vocabulary acquisition. In one list-learning study (Bousfield, 1953), a phenomenon termed clustering was found. Subjects who were given a list of randomly arranged items recalled the items in a cluster or "a sequence of associates having an essential relationship between its members" (p. 229). Sequences of related items were: hawk, eagle, vulture, and chicken, turkey, duck, goose. The first three words could be classified as birds of prey, and the others as domestic fowl.

Though clustering was explained in the behavioral terms of habit strength and relatedness increment, results indicated a sequencing of associates and led to further investigation of the clustering phenomenon. This categorization practice was found to be more effective during cued recall conditions (category names given for recall task) than noncued conditions (no category name given to aid recall). Explicit cues, those that tapped clustering, aided subjects' accessibility to words in memory (Tulving & Pearlstone, 1966).

Another group of studies indicated that "chunking" of several clusters of words improved subjective cluster recall (Bower, Lesgold, & Tieman, 1969). Subjects reducing the number of units to be retrieved by grouping the material to be learned into subjective clusters, either through using mental imagery, or through associating two or more groups of words together to form larger units or chunks of information.

An extended application of the phenomena of clustering or chunking was identified in a study by Perfetti and Goodman (1970). In their study, subjects were assigned to one of three treatment groups. Subjects in the

first treatment group had the target words read aloud to them in a standard list-learning procedure. The subjects in the second and third treatment groups heard each target word within the context of a sentence. For the subjects in the second treatment group, the target word had a high frequency correlation with the meaning inherent in the sentence, (e.g., organ-music), whereas for the subjects in the third treatment group, the meaning of the target word in the sentence was of low frequency (e.g., organ-body). A sentence for Treatment 2 was "The developing country is ready to take any steps necessary to ensure its independence," and the corresponding sentence for Treatment 3 was "Many families rent a house in the country for the summer months." For the word country, nation is the high frequency correlate and city, the low frequency correlate. All subjects were then given a recognition task; for each of 56 words, subjects were to indicate whether they had been presented with the word during the treatment. The list of 54 words included the 14 target words (E words), 14 high-associate words (H words), 14 low-associate words (L words), and 14 nonrelated words (N words).

Of primary interest in the recognition task was the number of false-positive responses (refer to Table 2). Perfetti and Goodman concluded that false responses were induced by sentences as well as by words, and in fact were possibly enhanced by sentences. For example, note the 47% of false-positive responses for L words by those in row 3 in Table 2. They further concluded that it was "likely that the semantic richness of sentences leads to the activation of a larger set of semantic properties, and this is reflected by responses to H words and L words, but not N words, the last having failed to make semantic contact with the activated features" (p. 423).

Table 2

Percent of Positive Responses to Four Word Types Under Three Conditions

Condition	Word Type[a]			
	E word	L word	H word	N word
Treatment 1	66	25	28	23
Treatment 2	44	25	39	16
Treatment 3	68	47	33	25

Note. Adapted from "Research in Comprehension in Reading" by F. B. Davis, Reading Research Quarterly, 1968, 3(4), p. 922.

[a] E word (target word)

L word (low frequency association with target word)

H word (high frequency association with target word)

N word (nonrelated to target word)

Thus the clustering that occurs when lists of words are of prime interest are subsumed by an "activation of a larger set of semantic properties" when processing connected discourse (p. 423).

These types of research findings led some investigators to look beyond behavioristic learning models to develop information processing models that would represent what seemed to be happening inside subjects' heads when the subjects were processing words and longer discourse.

The work of Collins and Quillian (1969, 1970) generated several hypotheses about information processing, two of which are represented by Subway Map Model and the Spreading Activation Model (1970). According to the Subway Map Model, if a subject were asked to respond in a yes-no fashion to the veracity of the statement "Canaries are yellow," "semantic memory lights" (1970, p. 312) would light a path of least resistance through the subject's hierarchical memory structure called animals until enough word-concepts (nodes) were connected that an inference could be made about the truth of the original statement. The Spreading Activation Model adds a facilitating effect in that, rather than only a single path of nodes being lit, closely surrounding categorical nodes would also be activated (see Figure 2). This model indicates that processing a second sentence about canaries (e.g., A canary can sing) would be faster than processing an unrelated sentence (e.g., The weather is cloudy). A 1975 study by Collins and Loftus reinforced the belief that something like spreading activation does take place when people process words, sentences, and prose.

Text Representation Comprehension Models

The role of the reading researcher has been characterized by the building of comprehension models based on the perimeters of memory models

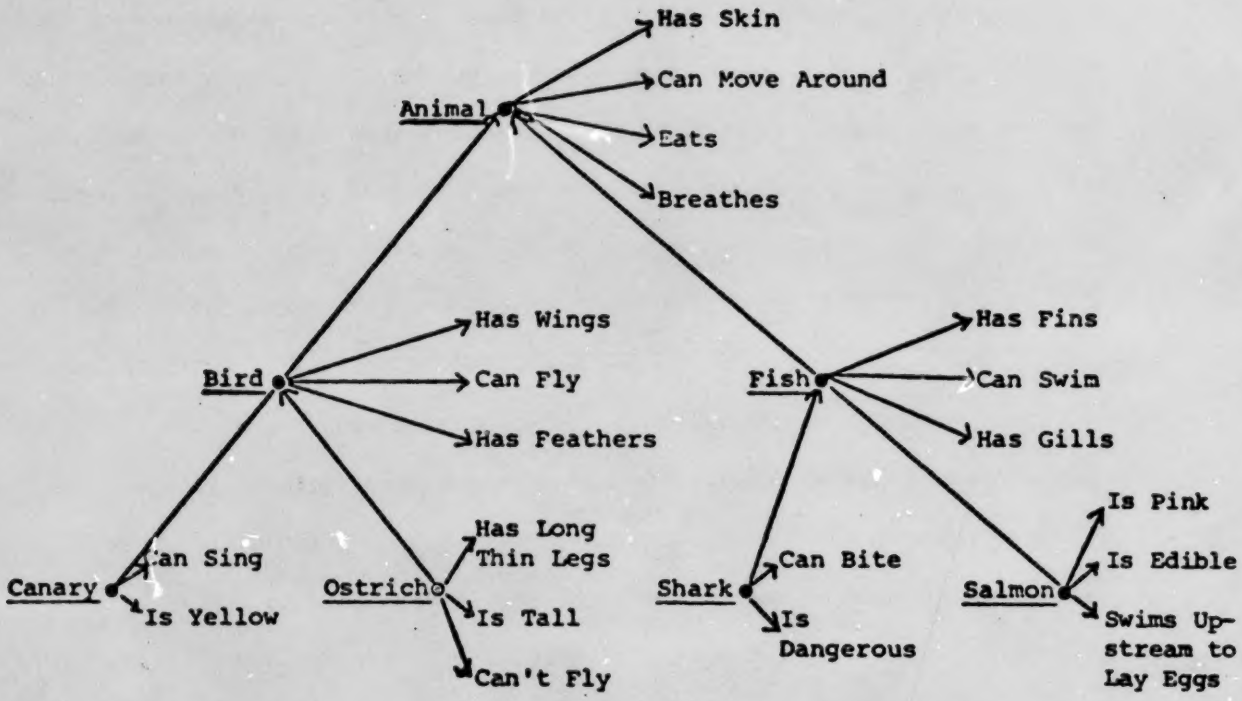

Figure 2. Spreading Activation Model: Illustration of the hypothetical memory structure for a three-level hierarchy.

Note. From "Retrieval time from semantic memory" by A. M. Collins and M. R. Quillian, Journal of Verbal Learning and Verbal Behavior, 1969, 8, 240-247.

and information-processing models. The task of building comprehension models involves going beyond the printed page and beyond the reader's responses to comprehension probes, to go into "the reader's head" in order to delineate the process of comprehension. To know how one knows is to begin to understand knowledge, the possessor of knowledge, and language--the mediator.

In the 1970's hierarchical and flexible memory models (Quillian's TLC, 1968; Collins and Loftus' Spreading Activation Model, 1975; Smith, Shoben, and Rips' Feature Comparison Model, 1974) began to supplement the linear, unidimensional memory models that had dominated the field until then. These more flexible models acknowledge Craik and Lockhart's (1972) levels of processing view of memory and Tulving's (1972) encoding specificity phenomenon, within a framework that necessitated the ability to infer. With semantic memory, as compared to episodic memory, the role of inferring is inherent.

When verbal learning research moved from serial, rote memorization of word lists to list learning of sentences and then to connected discourse, it became obvious that more was going on than simply the addition of chunked inputs into short-term memory buffers. The field of discourse analysis emerged as research began to focus on understanding the processes language users exhibit to construct coherent and contextually appropriate meanings from communication. The computer, an invaluable aid in much memory/comprehension research, required a coherent description of language, language processing constraints, and memory searching patterns. What was needed was a representation of meaning and an explanation of the type of comprehension processing that was apparently proceeding through a hierarchical structure in a forward and backward inference pattern. In their initial

work with computers, Schank and Abelson (1975) first emphasized the semantic decomposition of lexical features in an attempt to define a set of semantic primitives through which the meaning of a text could be defined. This was a prerequisite for developing the processing systems which would later attempt to reconstruct the textual representation of meaning.

Recall is one type of observable evidence that comprehension has taken place. The recall protocols displayed semantic chunking, omissions of redundancies, assimilation of meaningful propositions into new sentence combinations and sequences, and the intrusion of idiosyncratic novelties.

Processing of any type of communication is determined by the text itself and the overall knowledge of the comprehender. Comprehension involves the reader/listener in a problem-solving situation where integration of text and extra-textual knowledge must merge based on rules of inferences from both. How to determine the processes and inferences involved has been the province of research in the area.

Kintsch (1977) labels the basic units of meaning propositions. Propositions are groups of word concepts, one of which serves as predicator, and the others as arguments. The ordered and connected propositions represent the meaning of a text and are called text bases. The amount and depth of inferring are determined by controlling the number of propositions, the number of word concepts, and the number of embedded propositions while measuring reading time, reaction time, and recall time.

Kintsch, Kozminsky, Streby, McKoon, and Keenan (1975) in a series of studies attempted to identify some content variables that significantly effected comprehension and memory for prose. They found evidence that supported the following premises:

--The number of propositions in the text base is an important determinant of rate of comprehension and amount recalled.

--Text bases that include many different word concepts as arguments of propositions require more processing than text bases with few different word concepts, regardless of the number of propositions.

--Reading time is a function of the number of propositions processed as determined through immediate recall.

--More superordinate propositions are recalled than subordinate ones, regardless of the serial position. Superordinate propositions are forgotten more slowly than subordinates.

Utilizing such information about text bases, researchers began to manipulate variables to determine inference processes, types of inferences, coherence, and staging effects. Perry Thorndyke (1976) developed a view of the role of inferences in comprehension. He states:

> Information from incoming propositions is clustered together in contextual frames with plausible inferences that provide coherence and continuity. What is stored in memory then, is a structure encoding the situation described by a series of related propositions and their requisite inferences. Within such an organizing frame the inferences become indistinguishable from explicitly-stated information. (p. 440)

Paris (1975) adds to this view the role of constructive elaboration and integration. Readers expand explicit information through inferential operations and integrate these constructed relationships with the explicit base. The inferences provide an assimilative and accommodative function to achieve efficiency and parsimony of storage.

A later model of comprehension by Kintsch and Teun A. van Dijk (1978) includes an inference processing component. This text-based model incorporates the inference processes within its macro-rules. Based on the earlier propositional network theory, Kintsch and van Dijk described the reading process/comprehension process in a bottom-up, text-based manner. Within the framework of the model, top-down processes are also possible.

The model is based on the assumption that comprehension of a text comes from a response the reader creates, not something given in the text itself. The possible types of inferences are: inferring a missing link between propositions in order to make the text base coherent, inferring presuppositions, and inferring conversationally implied meaning (Kintsch, 1978, p. 77).

According to Kintsch and van Dijk, readers create responses by applying the macro-rules of generalization, deletion, integration, and construction to the super-structure (text). Generalization occurred when specific details are tied to a general topic to ensure memory. Propositions would be deleted if they did not tie into any general macro-structure or theme. Integration and construction occurs when information that is already a generalization is organized and compacted. This is done by integrating or deleting micro-information or details because they are already part of the macro-proposition or world knowledge. By constructing sequences, readers replace propositions by a macro-proposition that incorporated all the details. Using the construction macro-rule allows for the extraction of details at a later point during retrieval since they are inherent in the macro-proposition.

By applying the model, Kintsch and van Dijk can determine experimentally the capacity of the short-term memory buffer, maximum input per cycle, and the reproduction probability for different selection strategies. This can be achieved by analyzing which text propositions are recalled.

The progression from memory-processing models to text representation models is certainly understandable. If people process information from text in a particular fashion, then it could be assumed that text might contain similar inherent structures. The educational implications would then be to teach the underlying structure, the processing strategies, or the

cueing systems that allow for greater ease and competency in reading comprehension.

Recent studies in the comprehension of prose have attempted to include an acknowledgment of the structure inherent in text with the perspective implicit in the information-processing paradigm. This has enabled researchers (Armbruster & Anderson, 1980; Dansereau, Collins, McDonald, Holley, Garland, Diekhoff, & Evans, 1979; Holley, Dansereau, McDonald, Garland, & Collins, 1979; Long, Hein, & Coggiola, 1978) to determine more explicitly the comprehension processes as well as possible teaching strategies that tap the mental processes involved.

The Long, Hein, and Coggiola (1978) study, for example, attempted to determine if networking strategies used by readers to aid in comprehension did indeed help in processing prose. In their study, subjects were taught strategies that would help them "network" prose selections (see Figure 3). Although the intent of the study was to determine processes involved in the comprehension of prose selections, the importance of word knowledge was not overlooked. The networking strategies themselves emphasized:

1. Deciding importance of concepts
2. Reorganizing and re-representing material
3. Understanding relationships between concepts

Implicit in these strategies is the importance of concepts (words, phrases, sentences, paragraphs). What must once again be addressed, then, is the importance of word knowledge and its relationship within the comprehension process. A graphic representation of this importance is illustrated

Text: The Chevy Roadster, Model A Ford, and Model T Ford are different kinds of antique cars. The Chevy Roadster is more of a sports car than the Model A and Model T Fords. The Chevy Roadster has wood spoke wheels, leather seats, bullet headlights and a cutout. A cutout is a loud whistle placed in the exhause pipe of antique cars which can be turned off and on from the dash. Turning on the cutoff results in a loud whistle which aggravates parents and policemen.

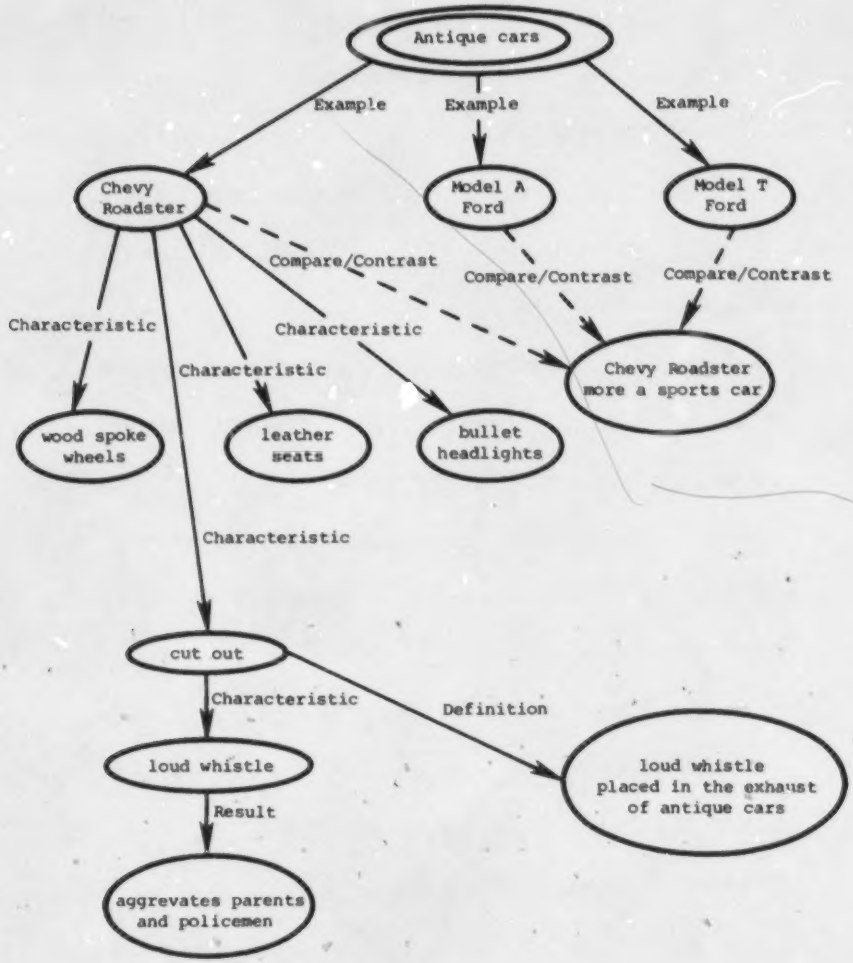

Figure 3. An example of a network.

Note. From Long, G., Hein, R., & Coggiola, D., Networking: A semantic-based learning strategy for improving prose comprehension. Paper presented at the annual meeting of the American Educational Research Association, Toronto, Canada, 1978, p. 5.

in Long, Hein, and Coggiola's model for prose comprehension from a networking perspective (see Figure 4).

Current Vocabulary Research

The memory models, information-processing models, text representation models, and comprehension studies discussed in the previous sections have had a notable effect on word knowledge and current vocabulary research. Information based on both the list-learning and information processing studies lend support to the general knowledge hypothesis regarding word acquisition and word knowledge. The following factors in word knowledge have been identified.

a. Readers "cluster" or "chunk" words into categories as a strategy for remembering lists of words (Bousfield, 1953; Bower, Lesgold, & Tieman, 1969).

b. Readers utilize semantic relations between and among words as a strategy for disambiguating words in sentences (Perfetti & Goodman, 1970).

c. Word concepts may be arranged in memory in categorical structures that are hierarchical in nature (Collins & Loftus, 1975; Collins & Quillian, 1969, 1970).

d. "Nodes," "links," or "networks" which facilitate the connection of information may be between the word-concept structures (Collins & Loftus, 1975; Collins & Quillian, 1969, 1970; Kintsch, 1977; Schank & Abelson, 1975).

Cues or strategies either employed directly in teaching vocabulary or elicited by the instructional strategy, must therefore relate new knowledge to

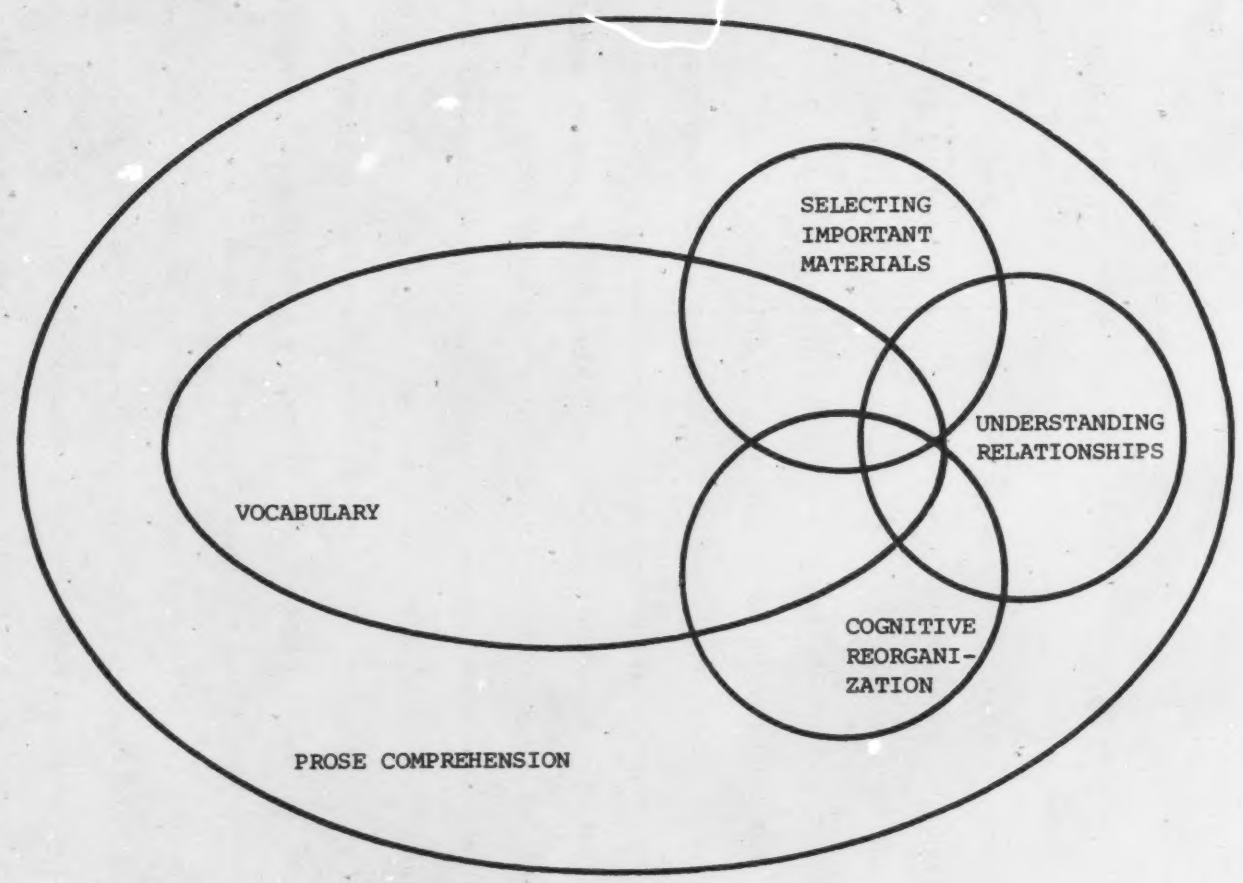

Figure 4. Prose comprehension from a networking perspective.

Note. From Long, G., Hein, R., & Coggiola, D., Networking: A semantic-based learning strategy for improving prose comprehension. Paper presented at the annual meeting of the American Educational Research Association, Toronto, Canada, 1978, p. 3.

that which is already known. Conceptual frameworks for stored word knowledge become crucial. If a person knows about canaries, it is likely that the person will also be able to respond to a question regarding their color. However, if a person does not know what a canary is, the person cannot be expected to respond in a reasonable fashion about its yellow color. A successful teaching strategy, in accordance with this view, might be to begin with the topic animals or birds and, using prior knowledge, "build bridges" (links, networks) between the known to the new (e.g., Canaries are birds. Canaries have color. Canaries are yellow.).

It appears that there are advantages to using teaching strategies that capitalize on categorically arranged conceptual frameworks to increase general vocabulary. Research suggests that this type of strategy would help retrieval of known words or concepts both for words in isolation and for words in the context of prose. Might one then extend the logic to say that these strategies would facilitate new word learning? If readers do categorize and map information in memory, educational implications are that the teaching and learning of new vocabulary would be facilitated if strategies which capitalize on these features were used.

In surveying the literature on the teaching of vocabulary, however, Petty, Herold, and Stoll (1968) stated that research has not shown one particular instructional method to be significantly better than any other. They found only that any vocabulary instruction is better than no vocabulary instruction. The studies they reviewed, however, represented primarily the instrumentalist and aptitude view of the role of vocabulary in comprehension. It must also be noted that more recently context (Gipe, 1978-79)

and the keyword method (Levin, Pressley, McCormick, Miller, & Shriberg, 1979; Pressley, Levin, & Delaney, 1981) have been shown to be effective teaching strategies.

In a review of literature on vocabulary acquisition, Manzo and Sherk (1971-72) concluded that any technique which drew attention to word parts or word meanings would positively influence word acquisition. They questioned which techniques would also develop increased word awareness or vocabulary enrichment. Their concluding suggestions emphasized the knowledge approach that "if we think of word learning as an extension of basic language learning, teaching vocabulary may be a relatively simple matter of exploiting experiences as a means of teaching vocabulary, and exploiting and using vocabulary as a means of getting the most from experience" (p. 88).

"Exploiting experiences" as a way of teaching vocabulary is not a new idea. A number of writers over the years have stressed the importance of providing children with experiences and relating those experiences to vocabulary concepts (Carroll, 1964; Dale, 1965; Dolch, 1953; O'Rourke, 1974). Instructional methods that relate readers personal experiences to the acquisition of new vocabulary words are recommended extensively in the literature (Harris & Smith, 1976; Herber, 1978; Johnson & Pearson, 1978; Smith & Johnson, 1980; Spache & Spache, 1977).

The acquisition of new word knowledge is based, in part, on the fact that "comprehension is building bridges between the new and the known"; i.e., for new concepts to be learned, they must be related to concepts already known (Pearson & Johnson, 1978, p. 24). Based on recent information-processing theories (Collins & Quillian, 1969; Lindsay & Norman,

1972; Massaro, 1975), the importance of prior knowledge and the way it is stored and retrieved has prompted a new focus in vocabulary research on determining appropriate vocabulary teaching techniques. Taylor, Thurlow, and Turnure (1974) reported that elaboration of word meanings, when accompanied by paragraph summaries, resulted in improved vocabulary development. Pany and Jenkins (1978) noted that having students practice reciting word meanings before reading a story was a more effective vocabulary teaching strategy than either having students infer word meanings from the context of the story or telling students the meanings of words as they read the story. However, the investigators did not consider the uneven distribution of instructional time involved in the treatments. The meanings-practiced condition took longer so that the increased exposure to the target words could explain the effectiveness of the strategy. In a subsequent study, Jenkins, Pany, and Schreck (1978) found that the meanings-practiced condition proved most successful on immediate and delayed measures of single word meanings and sentence comprehension. The meanings-practiced treatment did not yield significant results on paragraph comprehension.

While these studies have begun to explore the effectiveness of particular vocabulary teaching strategies for general vocabulary development and for preteaching for textbook selections, they have not considered prior knowledge as a concomitant variable, nor used teaching strategies that tap prior knowledge. Studies examining either of these concerns are few (Ahlfors, 1979; Hagen, 1979).

In the Ahlfors study, 80 sixth-grade students were randomly assigned to one of four groups: Definition Group, Context Group, Experience Group, or Control Group. For each of five weeks the treatment groups were

presented 10 targeted vocabulary words. The Definition Group, modeled after the practice technique reported by Petty, Herold, and Stoll (1968), practiced dictionary definitions through exercises and puzzles. The Context Group had vocabulary words presented within sentences; they were asked to determine meanings of the words from the sentences and then to use the words in their own sentences. The Experience Group created semantic maps for the targeted words. They were then asked to write a definition for the words related to their own experiences. The Control group read stories and answered comprehension questions with no particular mention of any vocabulary words. All four groups were given stories to read which incorporated the targeted words. All subjects were given a comprehension test, a multiple-choice definition test, an anomalous sentence test, a modified cloze test, and a free-recall test at the end of the weekly treatment. Delayed multiple-choice definition tests and anomalous sentence tests were also administered. Analyses showed that the Definition and Context treatments were superior to the Experience treatment and the Control Group. The Context treatment proved to be a consistently effective technique on all dependent measures with the exception of the multiple-choice definition test, on which the Definition treatment excelled. These findings are consistent with those of Gipe (1977, 1978-79) and also those of Pany and Jenkins (1978) and Jenkins, Pany, and Schreck (1978).

The Hagen study incorporated a control condition and three prereading vocabulary treatment conditions: semantic mapping, a sight vocabulary approach, and a prereading vocabulary activity modeled after directed

reading activities. Each strategy was assessed in terms of passage-specific literal comprehension and vocabulary understanding using posttests. The subject population consisted of fourth and fifth graders who were reading at a third-grade level. The prereading vocabulary activity (PRVA) treatment condition significantly improved both the literal comprehension and the vocabulary understanding of the subjects in the study. The PRVA was the most teacher-directed and text-specific treatment condition. One might hypothesize that the high degree of exposure to and practice with the vocabulary and sentences read in the passage selections, may have given the poor readers the necessary text-specific information for later retrieval.

Though neither of these studies indicate that treatment conditions which relate vocabulary study to subjects' experiences or prior knowledge bases were significantly more effective, several things must be noted:

1. Experience-related vocabulary teaching strategies appear to be better than no vocabulary instruction.
2. Amount of prior knowledge or experience-related manipulations in context conditions should be controlled.
3. Dependent measures designed for experience conditions should be utilized.
4. Experience-related strategies, other than semantic mapping, could be included in studies.

The Impact of Cultural Background on Vocabulary Acquisition and Comprehension

The importance of determining the role of prior knowledge in vocabulary acquisition and development is exemplified when looking at studies which investigate the vocabulary development of various cultural groups.

Beginning with the perspective of "cultural deprivation" as language deprivation, Philion and Galloway (1969) conducted a study using direct observation and item analysis (Gates Reading Survey, Form One and Form Two) as a basis for guidance in the development of a language arts program for Indian children in Canada. There were 225 elementary children, one-third of whom were Indian, tested at the beginning of the school year with the Gates Reading Survey, Form One, for placement into reading groups. During the school year all children were in a conventional reading program. They were again tested at the end of the year with Form Two for achievement testing purposes. Test scores alone indicated that the Indian children did not achieve as well as the non-Indian children in any areas of reading as tested by the Gates Reading Survey (Speed, Comprehension, Vocabulary). In this particular sample population, the Indian children's gains did not bring them up to the non-Indian children's initial level of achievement. Teachers had been given instruction in gridding the strengths and weaknesses of their students as individuals and as groups using item analyses of the Gates. Examination of the data revealed that certain children had difficulty in the areas of vocabulary and comprehension

> . . . because of very limited and narrow concept development; for example, the concept <u>combat</u>, form most of the Indian children and to a lesser degree non-Indian children, meant <u>army</u> . . . the specific army involved in the television program "Combat." . . . The word <u>leaf</u> for many of these children meant only the leaf of a maple tree. The word leaf did not refer to the leaves of other trees in the area, for example, evergreen leaves, not to mention the leaves in a book or magazine. (p. 560)

Observations of students and classrooms as a result of the item analysis led to observations in other areas of language development. "It was

observed that for purposes of getting along socially and of self-expression, language was more a convenience than a necessity for the young Indian child" (p. 598). What appeared to be missing in these Indian children's verbal repertoire was the use of language to explain, to describe, to instruct, to inquire, to compare, and to analyze (p. 600).

The above findings raise several questions about vocabulary acquisition and vocabulary development.

1. What are the differences in cultural background that seem to affect vocabulary acquisition?
2. What uses do children make of their different storehouses of prior knowledge as they expand their vocabularies?
3. How do children use new vocabulary to build bridges between prior knowledge and the comprehension of passages?

Evidence of cultural diversity in language development, experiential background, and various other elements of growth and learning have long been reported. For example, as early as 1932, Bartlett demonstrated that different cultural heritages affected comprehension in his "The War of the Ghosts" study. Englishmen were asked to read and recall a North American Indian Folktale. During recall (in some cases up to 10 years later), Bartlett found that subjects modified the story to a retelling consistent with their own culture.

In another study, Kintsch and Greene (1978) asked a group of American college students to recall two stories: a Grimm's fairy tale and an Apache Indian tale. Subjects recalled the sequencing of the Grimm's tale more easily than the Apache Indian tale. Unfortunately there were no Apache Indian subjects who were uni-cultural to include in the study for cultural comparisons across text.

A question that arises, then, is "How much difference does cultural background make in reading comprehension?" Several cross-cultural studies have attempted to address this concern. Steffensen, Jogdeo, and Anderson (1978) studied Asian Indians and Americans. Subjects were asked to read two comparable letters, one describing an Indian wedding and the other an American wedding. Results showed that both groups read the letter dealing with their own cultural background faster and recalled more of the culturally familiar text. The researchers concluded that the implicit background knowledge underlying a text profoundly influenced how well the text would be comprehended and later recalled. Even though the organization of the two texts was similar, the native passage was easier to process.

Another cross-cultural study which sheds light on cultural distinctions that influence comprehension is the study conducted by Mandler, Scribner, Cole, and DeForest (1980). They presented five stories to Vai-speaking subjects in Liberia. One of the five stories was a Vai folktale; the other four were foreign. However, when each of the foreign tales was translated into Vai, changes were made in certain terminology so there would be consistency with Vai traditions, e.g., "dragons" was changed to "water people" and "princesses" was changed to "chief's daughters." Among the findings of this study, there appeared to be little cultural differences in recall of the five stories. The researchers concluded that the cultural content of a story was less important than its form in determining how much was remembered. Was it, however, the "form" or the "structure" of the four foreign stories that was changed when certain vocabulary words were made consistent with the Vai culture, or were the stories made culture-specific through the use of traditional Vai vocabulary?

A bicultural study that in part reflects this concern was conducted by Reynolds, Taylor, Steffensen, Shirey, and Anderson (1981). Inner-city black and white, and rural white eighth-grade subjects were asked to read and recall a letter about a "sounding event." (Sounding is a form of ritual insulting.) It was hypothesized that the inner-city black subjects would recall the passage in a manner consistent with the author's intentions, while the white subjects would distort the meaning. This was found to be true. Black subjects recalled the passage as describing an event of language play, while both populations of the white subjects recalled it as a fight. The researchers concluded that familiarity with the implicit knowledge underlying a story (meaning the use of the word sounding) had a facilitating effect on reading comprehension.

"Cultural variation in the function and uses of language has important consequences for speakers of variants, particularly with respect to educational performance. Three consequences can be proffered: social, cognitive, and acquisition of school skills" (Gearhart & Hall, 1979, p. 2). Social consequences include attitudes of both educators and students toward dialect (including vocabulary) differences that affect status in schools. Cognitive consequences reflect differences "in public access to one's ideas" (Gearhart & Hall, 1979, p. 3). These differences may be in part based on differing cognitive processes involved in individuals' language acquisition and usage. The consequences for children's acquisition of school skills then might represent "semantic mismatches between reader's word meaning and author's word meaning" (Gearhart & Hall, 1979, p. 3). Any of the above three consequences of cultural variation in language will affect children's language development. Experiential backgrounds as reflected through idiosyncratic cultural language forms and content

(e.g., "water people," "chief's daughter," "soundings") do affect comprehension of communication and even perhaps acquisition of new language and language structures.

Vocabulary Teaching Strategies

The consideration of prior knowledge differences for cross-cultural and bicultural readers does not negate the importance of the traditional vocabulary teaching techniques such as phonic analysis, structural analysis, contextual analysis, use of dictionary and thesaurus, and mnemonic techniques. An awareness of the importance of prior knowledge simply switches the emphasis from the instrumentalist and aptitude hypotheses for vocabulary development to the general knowledge hypothesis. The need, then, is to determine the vocabulary teaching strategies which best tap the general knowledge hypothesis.

Several teaching strategies in use today are adaptable to the general knowledge orientation. These include contextual analysis, the keyword method, semantic mapping, and semantic feature analysis. A discussion of each of these strategies is given below.

Contextual Analysis

Contextual analysis, a word identification skill, is based on the notion that words are given meaning by the context they are in. With contextual analysis the reader is required to search for semantic, syntactic, or graphic cues surrounding an unknown word as a means of reducing the possibilities of what the word means (Smith & Barrett, 1980, p. 37). A mind set is created whereby students expect to derive meaning

for an unknown (or target) word through understanding the words or phrases that surround it.

For example, in the sentence, "My uncle, an itinerant preacher, traveled constantly and was always on the road," the words "traveled" and "on the road" help a reader to discern the meaning of the word "itinerant." Studies using contextual strategies as treatment conditions within the general knowledge orientation have been shown to be helpful in teaching vocabulary (Ahlfors, 1979; Gipe, 1977, 1978-79).

The types of words or phrases that surround the unknown word in a sentence may be categorized into different context clue types. In the many taxonomies delineating content clue types (Ames, 1979; Humes, 1978; Ives, 1979; McCullough, 1958; Thomas & Robinson, 1977), three explicit clue types consistently appear: (1) direct explanation, (2) appositive, and (3) contrast. (See Figure 5.)

A plethora of formats and activities may be generated from these context clue types. For example, in the Gipe (1978-79) study, subjects in the context condition were directed to respond to the target word in context with a word or phrase from their own experience. An example from Gipe's study is as follows:

> The barbarian kicked the dog and hit the owner in the nose. Any person who acts mean to anybody or to anything is a barbarian. Barbarian means a person who is very mean. Write down something that a barbarian might do at the dinner table. (p. 630)

The power of this contextual format may indeed stem from its linkage with prior knowledge concerns (Aulls, 1970-71).

Clue Type	Explanation	Example	Miscellaneous (Signals)
Direct Explanation	read like a simplified dictionary entry; explicitly defines terms	1. By kisterness is meant all the words a person knows well. 2. Botinals are words with opposite meanings. 3. The gennet is not the hero of a story. 4. A gespikin is a musical instrument.	-copulative verbs (is, was, means, forms)
Appositive	word, phrase, or dependent clause that restates the immediately preceding text--within same independent clause.	1. The natives believed that tinals, or evil spirits, lives beyond the river. 2. Bevils, not wichets, guarded the gates. 3. He recounted a mimang--an old story with unproven facts. 4. The chaitore, their chosen leader, spoke gravely to the crowd.	-punctuation (parentheses, dashes, commas) -articles, relative pronouns, and words such as or and that is
Contrast	may define an unknown term by explaining what it is not like--unfamiliar terms may be defined by contrasting them to familiar objects, places, people, groups, or ideas, juxtaposes 2 unlike entities (doesn't point out differences)	1. The samelt on the outside was not like the peace on the inside. 2. I wonder whether the money will be a blessing or a foge. 3. When my book is finished, it will be either thipanal or ordinary. 4. During the Christian era, music was dominated by the church. About the time of the crusades, however, independent yacule music emerged. (more difficult because processing 2 different parts of speech)	-words such as like, as, and than with a negative (e.g., not like, less than) -negatives (e.g., unlike, differs) -words implying alternatives, such as or and either, rather than, while

Figure 5. Content clue types.

Note. Information in this figure was taken from Humes, A., "Structures, signals, and cognitive processes in context clues." Researching in the Teaching of English, 1978, 12, 321-334.

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Keyword Method

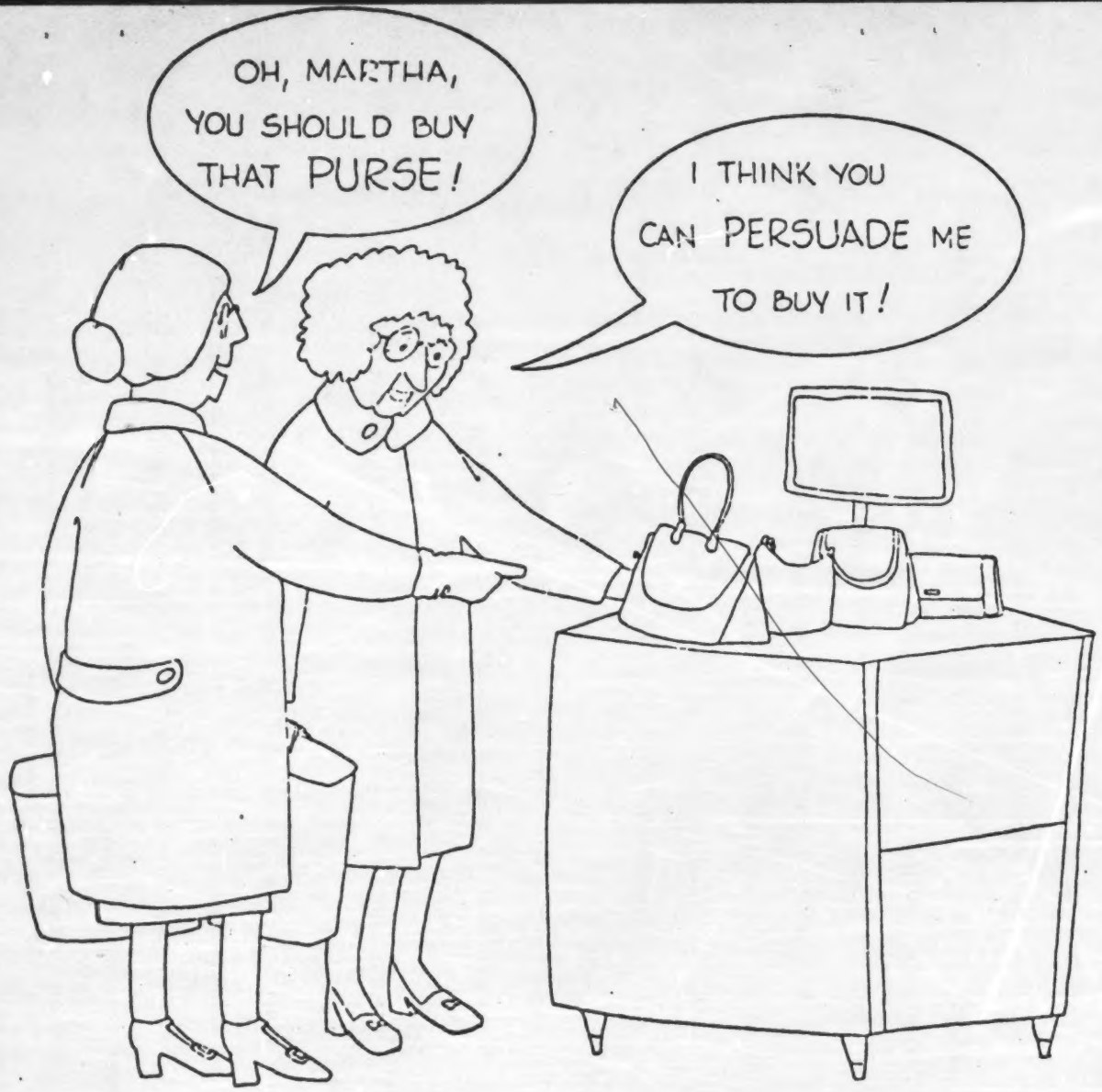
The mnemonic keyword method, which was originally developed as a method for improving college students' foreign language vocabulary acquisition, is a strategy that has been found to facilitate student's recall of definitions, given vocabulary items (Pressley, Levin, & Miller, 1980). The instructional sequence for the keyword method is as follows:

1. Students learn a keyword which sounds like a salient part of the new target word and which is, ideally, picturable.
2. Students are instructed to form a visual image in which the keyword and the target word referents are interacting. See the example for the vocabulary word "persuade" in Figure 6.
3. When the student is later asked the meaning of the target word, the keyword is evoked which, in turn, re-evokes the image of the target word.

The keyword method has been the focus of much educational research in the area of foreign vocabulary learning as well as other curricula areas (Levin, in press). The success of the keyword method depends on the dual processes of stimulus recoding and associative linking. Meaningful associative links are critical to this method. The associative linking inherent in this method affords a subjective clustering type of cognitive strategy (Bower, Lesgold, & Tieman, 1969; Tulving & Pearlstone, 1966).

Semantic Mapping

Semantic mapping is a categorical structuring of information in graphic form. It is an individualized content approach, in that students are required to relate new words to their own experiences and prior knowl-



PERSUADE (PURSE) When you talk someone into doing something.

Figure 6. Example of the keyword method.

Note. From "The Mnemonic '80s: Keywords in the Classroom." Educational Psychologist, in press.

edge (Johnson & Pearson, 1978). A completed semantic map provides the teacher with information about what the students know and reveals anchor points upon which new concepts can be introduced. One completed map for conservation is shown in Figure 7.

The general instructional sequence for semantic mapping is:

1. Select a word (topic) of classroom interest or need, such as a word central to a story to be read.
2. Write the word on the chalkboard.
3. Ask the class to think of as many words as they can which are in some way related to the word and jot them on paper, in categories.
4. Have individuals share the words they have written and, as they do, write them on the board and attempt to put them into categories.
5. Number the categories and have the students name them as shown in Figure 7.

Student discussion is crucial to the success of semantic mapping. The meanings and uses of new words, new meanings for known words, seeing old words in a new light, and seeing the relationships among words are the outcomes of semantic mapping.

Refocused semantic maps help students to become familiar with text-specific word meanings associated with the central concept (Hagen, 1979); when the map is finished, text comprehension will be facilitated. The teacher initiates refocusing by giving several related concept words. For example, a specific meaning for the word boom from an historical passage on Wisconsin logging might produce a refocused semantic map such as that shown in Figure 8.

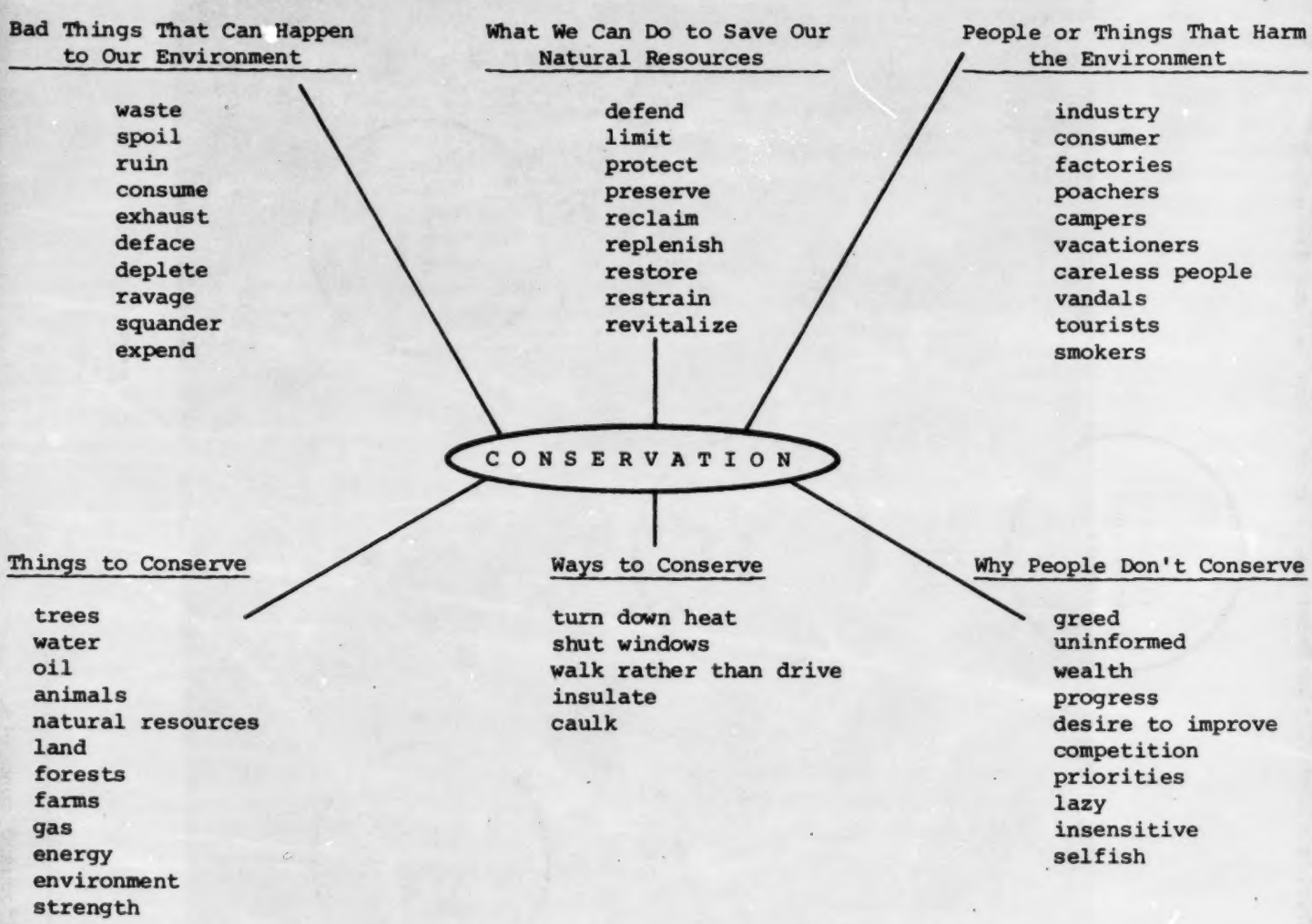


Figure 7. Semantic Map: Conservation.

Text: During a severe thunderstorm, a boom might become dislodged.

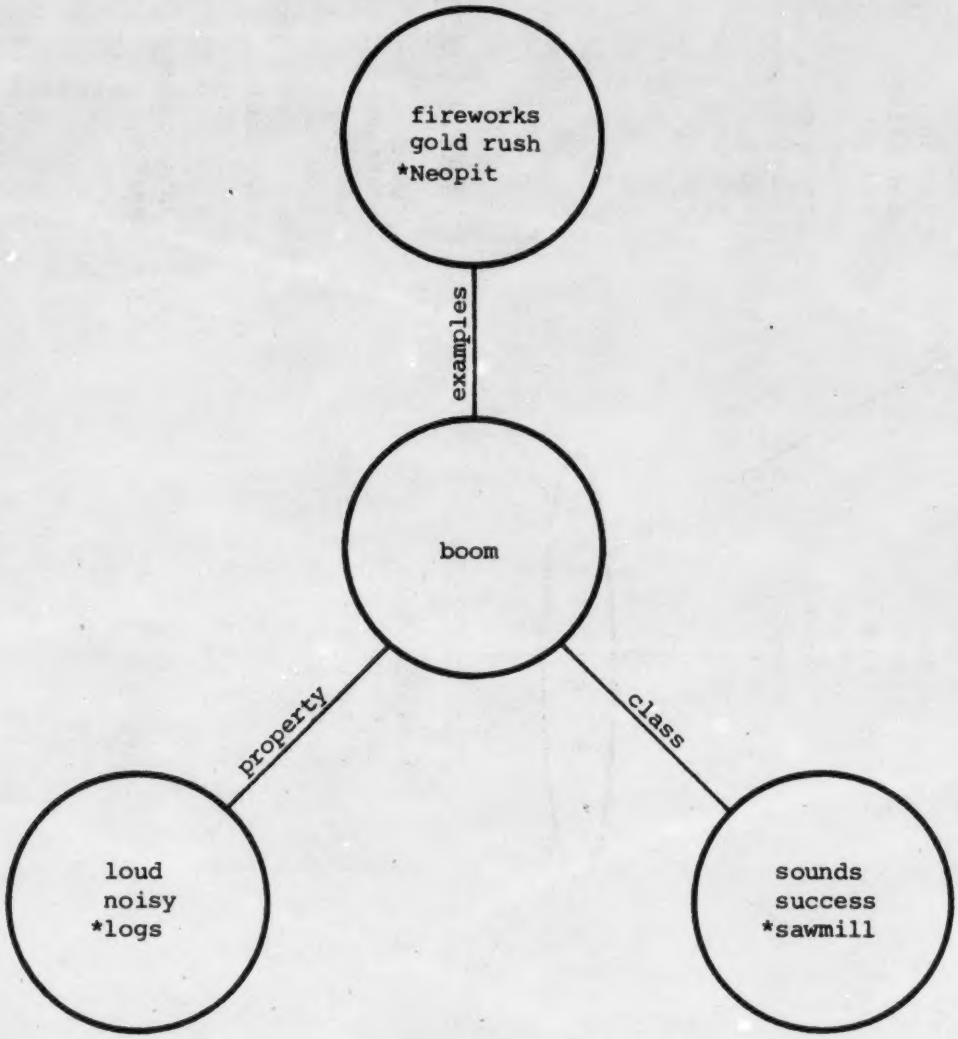


Figure 8. Refocused semantic map of "boom."

*Refocused concepts.

Semantic Feature Analysis

Semantic feature analysis capitalizes on the categorical nature of memory structures for individual words and words in prose contexts. This strategy focuses on the ways in which words within a category are alike and different and, through discussion, relates their meanings to prior knowledge (Johnson & Pearson, 1978). In semantic feature analysis, vocabulary is presented in a logical, classified way. The grids display relationships between words as well as finer nuances within and between concepts. An illustration of a partially completed semantic feature analysis grid for shelters is shown in Figure 9. Clark (1973) concluded that, as a child's age and experiences increase, there is a concomitant progression toward the acquisition of differentiated features of word meanings. Therefore, in more sophisticated grids, the + and - notations would be replaced by numerical ratings (e.g., 1-5) to indicate varying degrees of relationship.

The general instructional sequence for semantic feature analysis is:

1. Select a topic.
2. List, in a column at the left, some words which relate to that topic.
3. List, in a row along the top, features shared by some of the words in the column.
4. Have students put pluses or minuses in the grid to indicate whether or not each word that is listed in the column shares each of the features that is listed along the top.
5. Encourage students to add additional words and features.

SHELTERS

KINDS OF SHELTER	DESCRIPTION OF SHELTERS									COST OF SHELTERS			THINGS YOU FIND IN SHELTERS			
	large	small	exquisite	lovely	rustic	simple	spooky	dilapidated	open	cheap	expensive	reasonable	freezer	bed	wine cellar	tools
cabin			-		+			-								
villa	+	-	+	+	-	-	-	-	-	-	+	-	+	+	+	?
palace			+		-			-								
shed			-		+			-								
hovel	-	+	-	-	+	+	-	-	+	+	-	?	-	-	-	+
barn			-		+			-								
tent			-		+			-								
an old abandoned house			-		-			+								

Figure 9. A partially completed semantic feature analysis grid: Shelters.

6. Have students complete the expanded matrix with pluses and minuses to indicate whether each word shares each feature.
7. Conduct a discussion of the uniqueness of each word as reflected by the pluses and minuses on the grid.

As with semantic mapping, discussion is an important part of the procedure.

Conclusion

The above explications of possible vocabulary teaching strategies represent only a sampling of some of the available techniques which might tap existing memory structures and processes for word knowledge comprehension. It might be that some of these teaching strategies would be more effective for general vocabulary development while others are more effective for text-specific vocabulary development. Research is needed that will determine the utility of these strategies in particular learning situations. The shift in vocabulary studies from a general understanding of vocabulary acquisition to an emphasis on teaching strategies indicates a need by researchers and practioners alike to find ways to help children use what they know to learn more from text. The project to Investigate the Relationships Between Prior Knowledge, Vocabulary Development, and Passage Comprehension with Culturally Diverse Students at the Wisconsin Research and Development Center is engaged in a program of research which explores the effectiveness of various vocabulary teaching strategies and analyzes student-learner processes in relating prior knowledge to the acquisition of new vocabulary.

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